

The Influence of Land Surface State Initialization on Seasonal Forecasts Skill in the NCEP NOAA-LSM Climate Forecast System (CFS-NOAA)

Figures

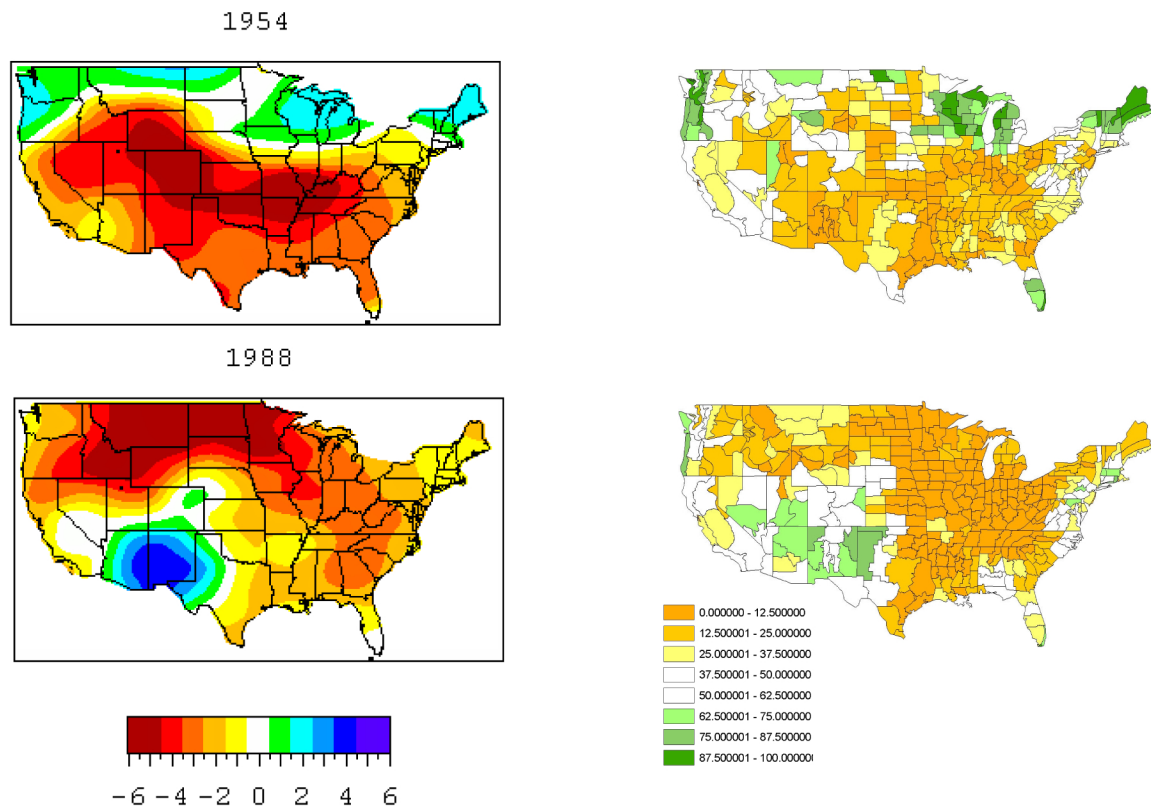


Figure 1: Comparison of VIC-based drought index (right panel) with reconstructed Palmer Drought Severity Index (PDSI) for 1954 (top panels) and 1988 (lower panels).

PDSI versus VIC Soil Moisture Index averaged over the US.

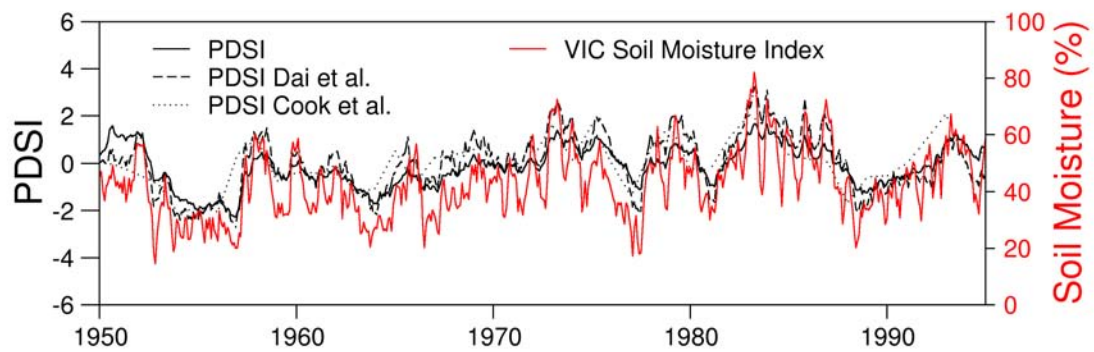


Figure 2: Times series of Palmer Drought Severity Index (PDSI) (black curves) and the quantiles of the VIC soil moisture (red curve).

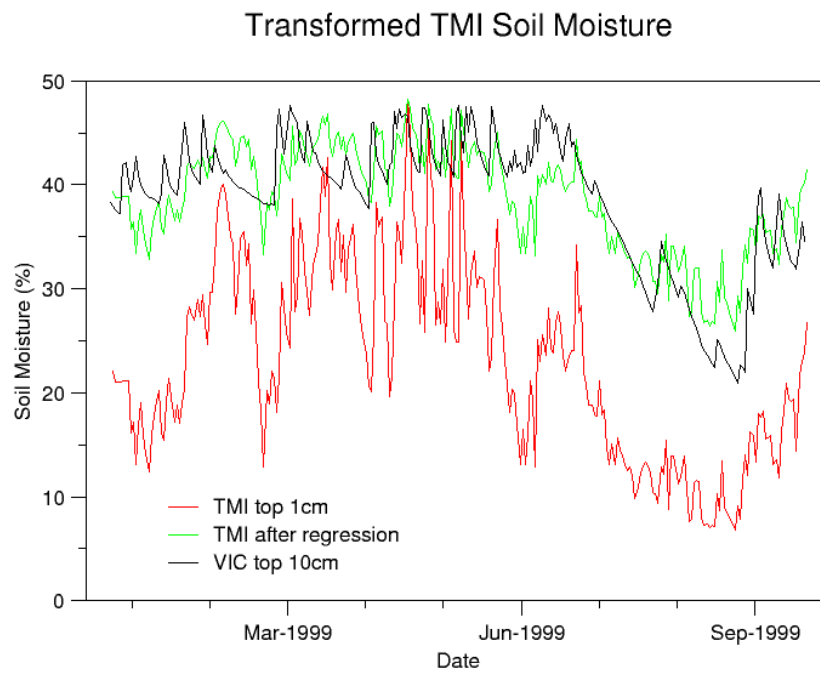


Figure3: Relationship between surface TMI and deeper modeled soil moisture.

Summary of Runoff Error Reduction by Assimilating SM

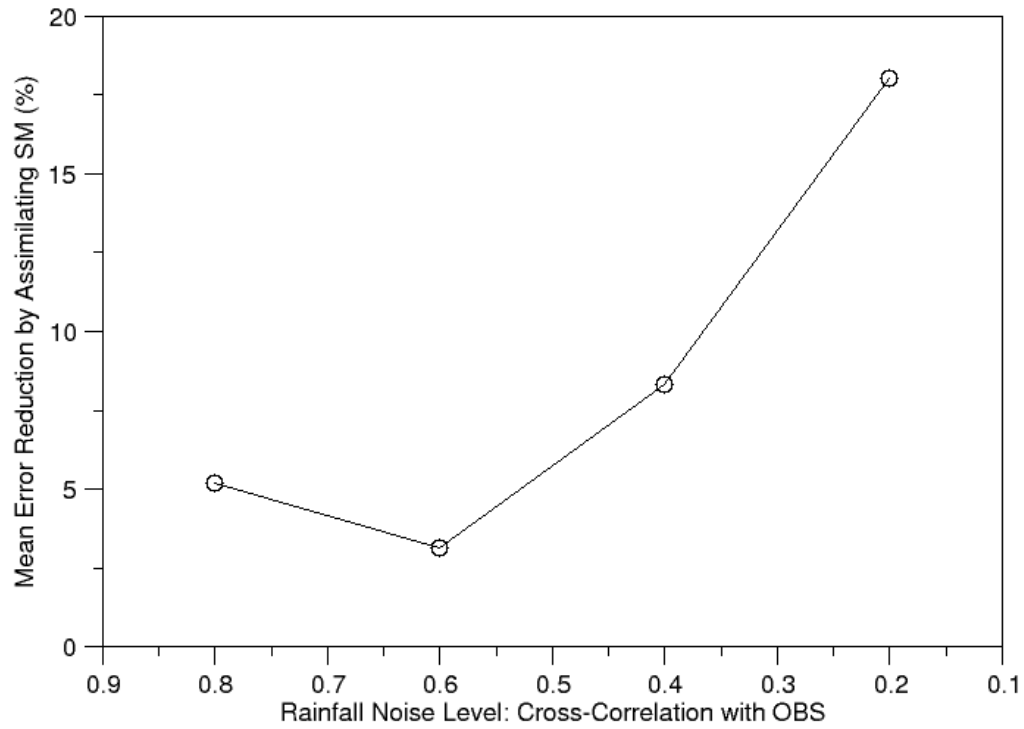


Figure 4: Forecast improvement from assimilating soil moisture at the beginning of the forecast period.

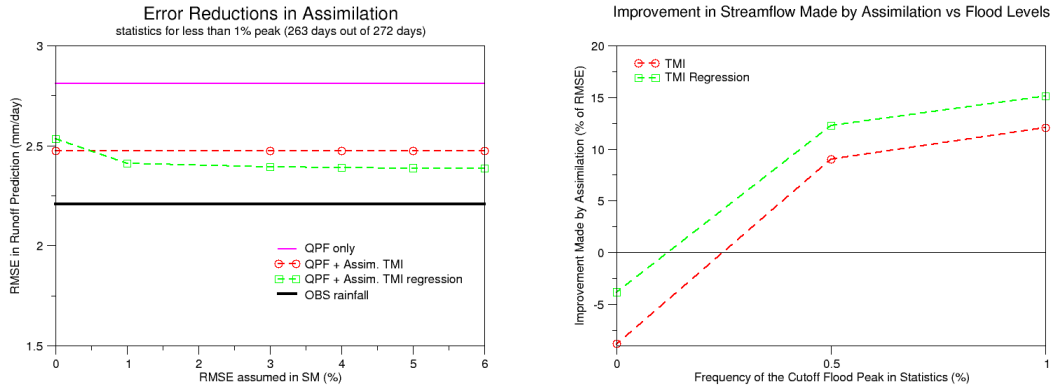


Figure 5: RMS error reduction (mm/day) in streamflow prediction through assimilation of TMI-based soil moisture. Left panel, results for the flows below the 99th quantile. Right panel, results as a function of the quantile levels. The curve 'QPF only' is without soil moisture assimilation.

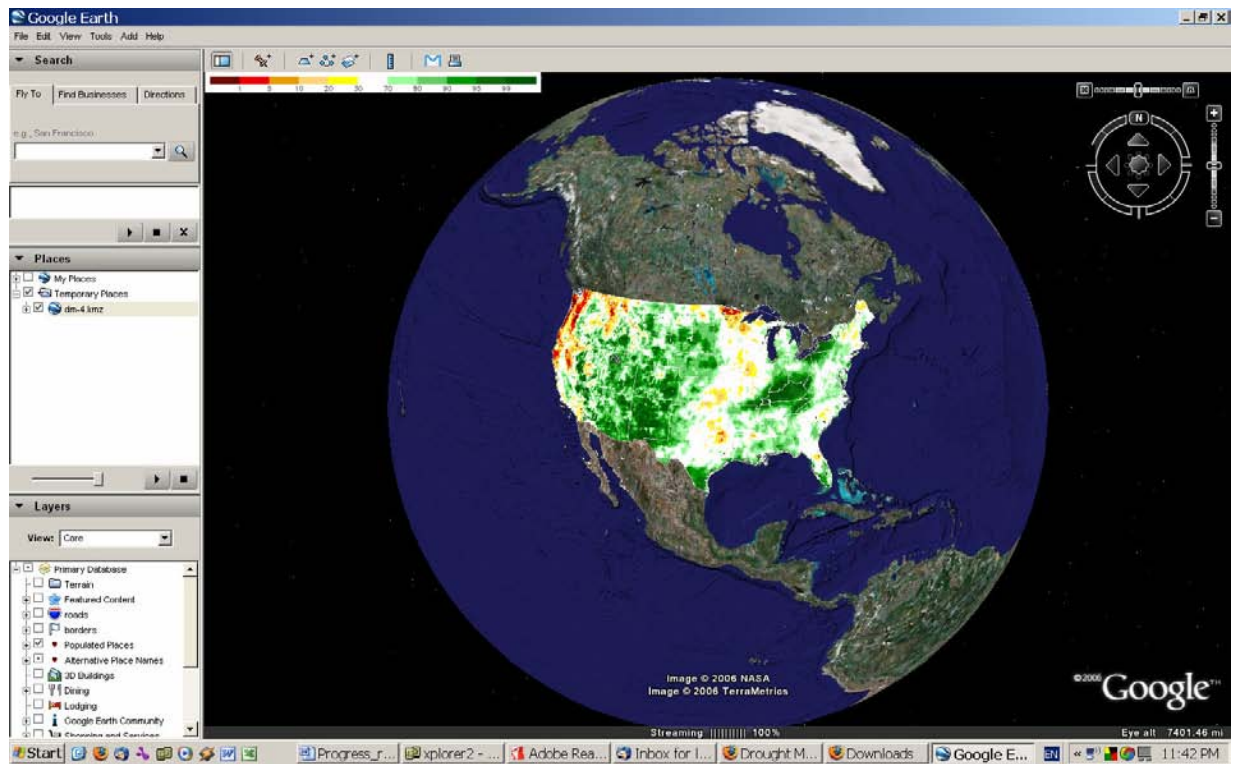


Figure 6: Real-time drought monitoring using VIC and NLDAS products is available on the Google Earth™ platform.

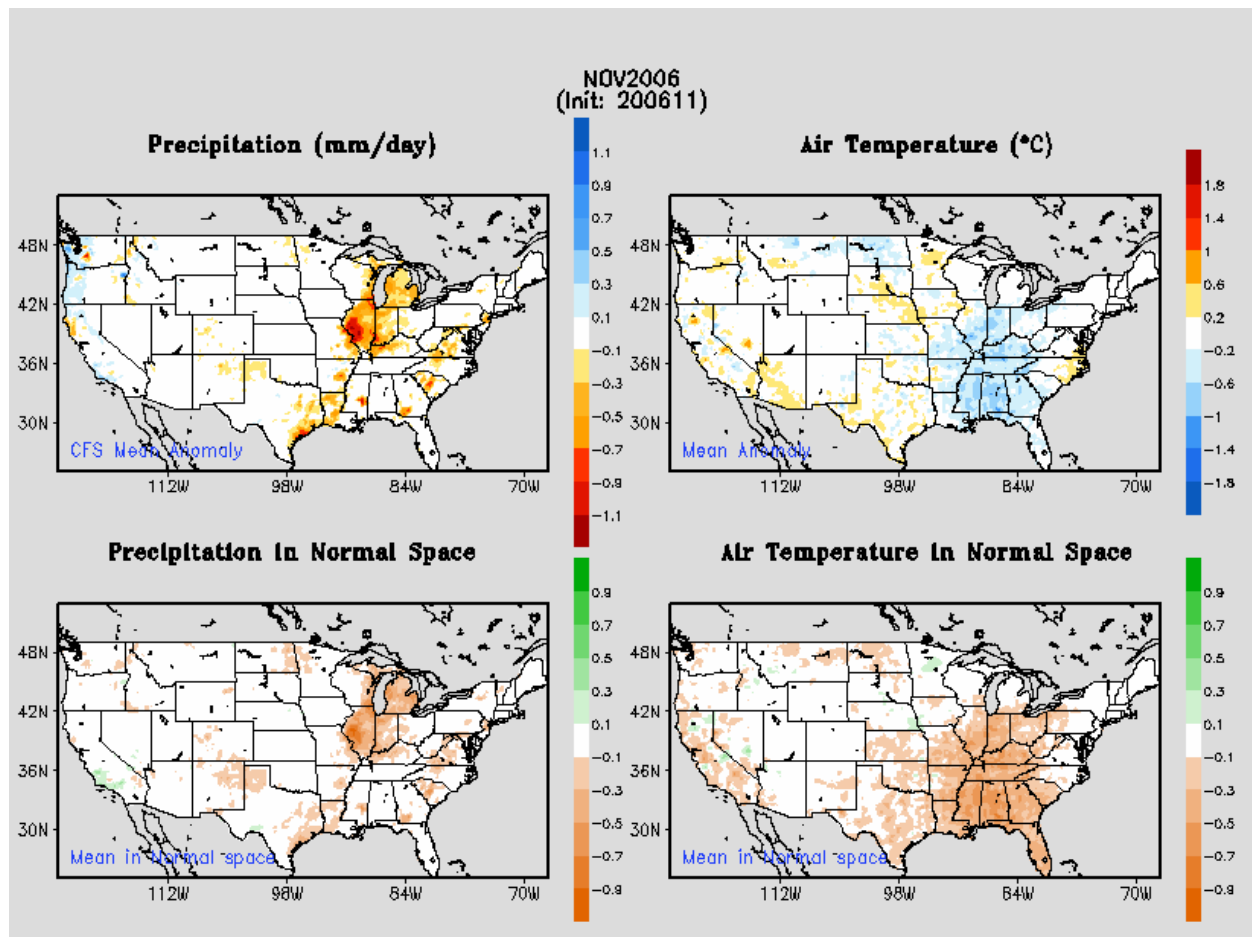
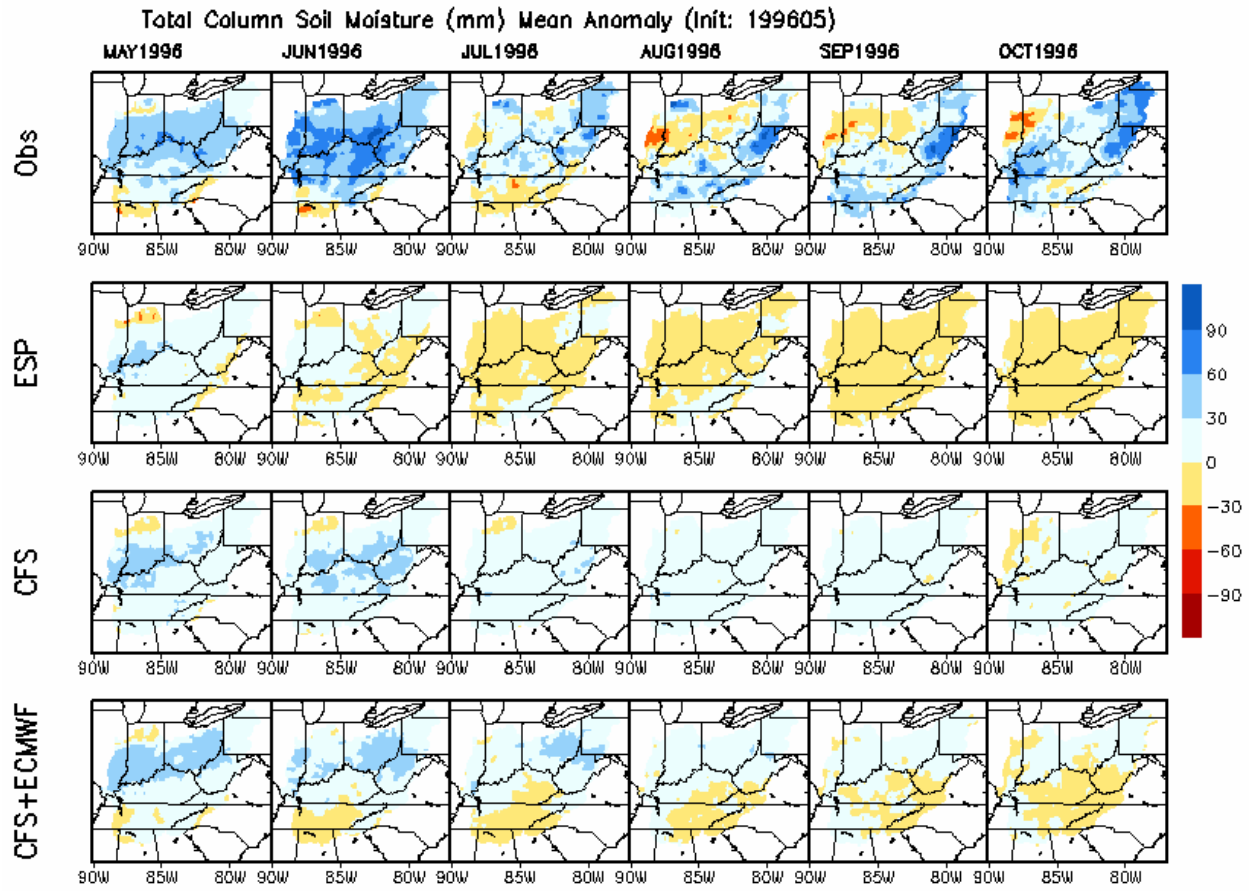


Figure 7: Monthly precipitation and air temperature forecast over the US using realtime CFS seasonal forecast and NLDAS products. The merging of CFS forecast and historical observations is done in a “normal space” (bottom row) and is transferred back to precipitation (or temperature) space using an equal-percentile mapping method.



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Figure 8: Soil moisture forecast over the Ohio River basin for a 6-month period starting May 1996. Three different forecast methods are used. “ESP” is the traditional ensemble streamflow prediction method, “CFS” merges CFS forecast with climatology, and “CFS+DEMETER” uses forecasts from CFS and all seven DEMETER models. The “Obs” of soil moisture comes from the 50 year offline simulation using NLDAS products.